The asTTle mathematics scores were derived through one-parameter item response theory (IRT) scoring. The asTTle IRT scores were transformed to a scale score (Year 6 M = 500, SD = 100), and the standard error of measurement for asTTle performance estimates has been estimated to be 15 (Hattie, Brown, Keegan, et al., 2004).

Elementary students were presented with the teachers care about me (5 items) and enthusiasm for learning (5 items) factors. High school students were presented the positive peer interactions (6 items) and satisfaction and involvement with learning (6 items) factors. Responses are recorded on a four-point rating scale (4 = “I agree a lot”, 1 = “I disagree a lot”).

Students completed a six-item attitude survey for mathematics which forms two inter-correlated scales: liking the subject and self-efficacy in the subject (Otunuku & Brown, 2007). Students responded by selecting one of four “smiley” faces (1 = “very unhappy”, 4 = “very happy”).

School quality is a multi-faceted concept which goes beyond transmission of knowledge or the development of learning skills to include structure, teaching, curricula, affective, and social environments. Accordingly, researchers have sought to identify the interplay of affective factors and relationships within schooling that support the enhancement of academic achievement (Ainley, 1999; Anderson & Bourke, 2000). The problem investigated in this study is whether students’ mathematics performance is positively predicted by students’ perception of quality of school life in the classroom (i.e., peers, teachers and learning environment) as well as by their attitudes to mathematics (i.e., liking and self-efficacy) in elementary and high school. The aims of this study were (1) to validate the QSL factor structure in the New Zealand context, (2) to explore relationships among the QSL factors, self-efficacy, interest in mathematics, and mathematics achievement, and (3) to discover and suggest implications which are effective in promoting students’ academic performance.
Analysis Methods

The analysis involved first corroborating the expected factor structure of the QSL and subject-attitudes using confirmatory factor analysis. Upon finding a stable, theoretically meaningful relationship in each measurement model, multiple-group confirmatory factor analysis (MGCFA) was used to establish factorial invariance of the models for different populations of students (i.e., sex and ethnicity). Then, structural equation modeling (SEM) was carried out to investigate the inter-relationships of three structures (i.e., QSL, subject attitudes, mathematics performance). All analyses were conducted with AMOS 7.

Results

The model had acceptable fit (N=336; \( \chi^2 = 450.24; \text{df} = 148; p<.001; \chi^2/\text{df}=3.04; \) gamma hat = .91; SRMR=.085; RMSEA = .078). Students' perceived quality of learning positively predicted how much they liked mathematics (\( \beta = .87 \)) and how highly they rated their self-efficacy in mathematics (\( \beta = .45 \)). Students who perceived more positive, supportive teacher relationship liked mathematics more (\( \beta = .33 \)). Male sex predicted higher self-efficacy ratings (\( \beta = .15 \)), while non-majority ethnicity increased liking of mathematics (\( \beta = .17 \)). Only self-efficacy in mathematics had a statistically significant prediction to academic performance (\( \beta = .45 \)); all other affective and demographic variables had no systematic relationship to academic performance.

The model had acceptable fit (N=272; \( \chi^2 = 390.53; \text{df} = 184; p<.001; \chi^2/\text{df}=2.12; \) gamma hat = .93; SRMR=.074; RMSEA = .064). Students' perceived quality of learning positively predicted how much they liked mathematics (\( \beta = .78 \)), how highly they rated their self-efficacy in mathematics (\( \beta = .34 \)), and how much they achieved in mathematics (\( \beta = .19 \)). Similar to elementary students, high school students who perceived more positive peer relationship liked mathematics more (\( \beta = .42 \)). Male sex predicted higher self-efficacy ratings (\( \beta = .16 \)), while non-majority ethnicity increased liking of mathematics (\( \beta = .15 \)). Self-efficacy in mathematics had a statistically significant prediction to academic performance (\( \beta = .34 \)).
Discussion and Conclusion

This study demonstrated that the QSL model had both a meaningful factor structure and estimates of reliability and, thus, was supported for use with New Zealand elementary and high school students. The QSL quality of learning factor positively predicted liking of mathematics and the quality of teacher-student interaction, and peer relationships positively predicted liking mathematics. Mathematics performance was predicted primarily by self-efficacy ratings which were, in turn, increased by the quality of learning. It does seem that self-confidence is a major source of influence on achievement. Students who have confidence in their ability to control their engagement and learning activities achieve more. Clearly, self-efficacy is partly predicted by greater engagement and commitment to learning, and so this aspect of quality of school life is of much importance to teachers. This does suggest that teachers would do well to raise students’ ability to control and engage in their learning activities, as this can then have a consequential positive impact on their self-efficacy and their performance in mathematics.

References


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